10-27-1965

Test 923: Massey-Ferguson MF 1100 (Diesel)

Tractor Museum
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NEBRASKA TRACTOR TEST 923 - MASSEY-FERGUSON MF 1100 DIESEL

POWER TAKE-OFF PERFORMANCE

		Fuel Consumption			Temperature Degrees F			
Hp	Crank-shaft speed rpm	Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
93.94	2200	6.096	0.449	15.41	181	55	75	29.213
Standard Power Take-off Speed (1,000 rpm)—One Hour								
88.74	2000	5.597	0.436	15.85	181	54	74	29.210
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
82.20	2263	5.415	0.456	15.18	178	55	76	.....
0.00	2325	1.656	.....	.....	168	54	73	.....
41.56	2297	3.408	0.567	12.19	170	55	76	.....
93.11	2200	6.117	0.455	15.22	183	55	77	.....
20.88	2308	2.514	0.833	8.31	169	55	75	.....
62.13	2279	4.361	0.486	14.25	174	55	75	.....
Av 49.98	**2278**	**3.912**	**0.542**	**12.78**	**173**	**55**	**75**	**29.217**

DRAWBAR PERFORMANCE

					Fuel Consumption			Temp Degrees F			
Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool-ing med	Air wet bulb	Air dry bulb	Barom-eter inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear (3rd Lo-Lo MP)											
84.61	6886	4.61	2201	5.36	6.220	0.509	13.60	190	45	56	29.290
75% of Pull at Maximum Power—Ten Hours—5th Gear (3rd Lo-Lo MP)											
66.55	5172	4.83	2270	3.90	5.046	0.525	13.19	181	53	62	28.940
50% of Pull at Maximum Power—Two Hours—5th Gear (3rd Lo-Lo MP)											
46.50	3522	4.95	2303	2.78	4.038	0.601	11.52	177	32	34	29.295
MAXIMUM POWER WITH BALLAST											
73.34	11122	2.47	2248	14.66	2nd Gear (1st Lo-Hi MP)			191	55	72	29.070
82.77	9564	3.25	2203	8.68	3rd Gear (2nd Lo-Lo MP)			181	47	55	29.150
81.81	7267	4.22	2201	5.70	4th Gear (2nd Lo-Hi MP)			183	47	55	29.150
85.63	6974	4.60	2199	5.32	5th Gear (3rd Lo-Lo MP)			184	52	64	29.125
80.62	5129	5.89	2200	3.83	6th Gear (3rd Lo-Hi MP)			181	52	64	29.125
81.76	4930	6.22	2198	3.75	7th Gear (1st Hi-Lo MP)			183	52	64	29.125
79.47	3763	7.92	2202	2.78	8th Gear (1st Hi-Hi MP)			184	54	71	29.125
79.56	3001	9.94	2198	2.20	9th Gear (2nd Hi-Lo MP)			183	54	71	29.070
73.93	2198	12.61	2202	1.96	10th Gear (2nd Hi-Hi MP)			185	54	71	29.070
75.39	2055	13.76	2201	1.54	11th Gear (3rd Hi-Lo MP)			183	54	71	29.070
MAXIMUM POWER WITHOUT BALLAST											
84.00	6940	4.54	2199	7.26	5th Gear (3rd Lo-Lo MP)			180	54	66	29.160

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear (3rd Lo-Lo MP)

Pounds pull	6974	7304	7499	7709	7645	7539
Horsepower	85.63	80.19	72.97	65.36	55.35	45.74
Crankshaft speed, rpm	2199	1973	1753	1530	1307	1095
Miles per hour	4.60	4.12	3.65	3.18	2.71	2.28
Slip of drivers, %	5.32	5.63	5.94	6.09	6.24	5.94

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 23.1-34; 8; 16	Two 23.1-34; 8; 16
Ballast	—Liquid	1295 lb each	None
	Cast iron	388 lb each	None
Front tires	—No, size, ply & psi	Two 11.00-16; 6; 20	Two 11.00-16; 6; 20
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		20½ inches	21½ inches
Static weight	—Rear	10785 lb	7420 lb
	Front	3960 lb	3840 lb
Total weight with operator		14920 lb	11435 lb

Department of Agricultural Engineering

Dates of Test: OCTOBER 27 TO NOVEMBER 1, 1965

Manufacturer: MASSEY-FERGUSON, INC., DETROIT, MICHIGAN

FUEL, OIL and TIME Fuel No 2 diesel **Cetane** 57.0 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8312 **Weight per gallon** 6.920 lb **Oil** SAE 20-20W **API service classification** MS, DS **To motor** 4.422 gal **Drained from motor** 3.506 gal **Transmission and final-drive lubricant** Massey-Ferguson Oil M-1127 **Total time engine was operated** 43½ hours.

ENGINE Make Perkins Diesel **Type** 6 cylinder vertical **Serial No** C 8833165 **Crankshaft mounted** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.875" x 5" **Compression ratio** 16 to 1 **Displacement** 354 cu in **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** dry type with replaceable paper element **Oil filter** replaceable paper element **Oil cooler** radiator for transmission and hydraulic oil **Fuel filter** primary filter with replaceable paper cartridge and agglomerator, and final filter with replaceable paper cartridge **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** DRW650-000030 **Tread width** Rear 72" to 94" front 60" **Wheel base** 102.06" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 30.6" Vertical distance above roadway 36.0" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial range operator controlled power shifting. **Advertised speeds mph** first 2.18 second 2.76 third 3.45 fourth 4.35 fifth 4.74 sixth 5.97 seventh 6.30 eighth 7.93 ninth 9.93 tenth 12.50 eleventh 13.62 twelfth 17.16 reverse first 1.79 second 2.26 third 5.15 fourth 6.49 **Clutch** single plate dry disc operated by foot pedal **Brakes** double disc hydraulically power actuated operated by two foot pedals which can be locked together **Steering** hydraulic with power assist **Turning radius** (on concrete surface with brake applied) right 140" left 140" (on concrete surface without brake) right 164" left 164" **Turning space diameter** (on concrete surface with brake applied) right 280" left 280" (on concrete surface without brake) right 328" left 328" **Belt pulley** none **Power take-off** 540 or 1000 rpm at 2000 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage. Twelfth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 923.

L. F. LARSEN
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
J. J. SULEK
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representaitve makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

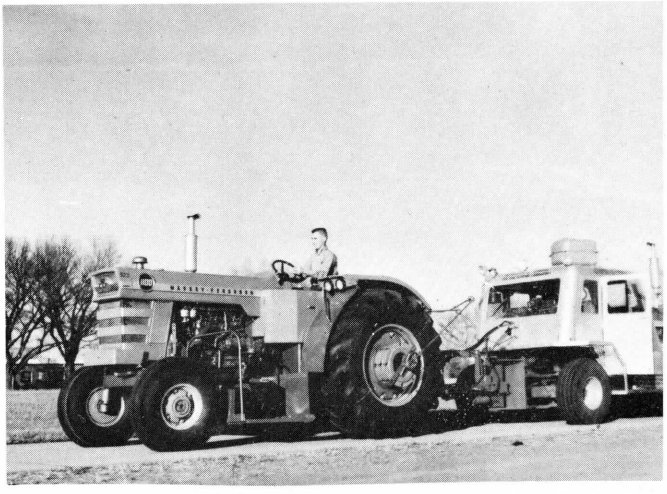
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



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